Collaborative Science for Environmental Solutions: Collaborative Hydrologic Research in the Clarksburg Special Protection Area

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The Clarksburg Special Protection Area (CSPA) in Montgomery County, MD, is on the outer edge of the exurban development shockwave from the Washington, D.C., metropolitan area. The CSPA is an area of rapid development that will be built out within the next five years. The Montgomery County Department of Environmental Protection (DEP) has been monitoring stream biology and chemistry in the area streams, and the CSPA involves special best management practices (BMPs) that are designed to limit the impact of development on water resources.

This research is an example of a federal/local technology transfer partnership in which innovative technologies are researched at the federal level and the results made available at a local level for neighborhood solutions. This research is a collaborative effort in which local stakeholders are involved setting research goals and federal agencies are involved offering expertise and capabilities not available at the local level.

The objective of the research is to correlate the impacts of ongoing development and the mitigating effect of local BMPs on the hydrological, biological, and chemical parameters of the CSPA water resources using both positive and negative controls (e.g., stream gauges, monitoring in areas without development and areas developed without the CSPA BMPs) as well as pre- and post-development data from areas gauged prior to development within the CSPA. We are focused on determining the effectiveness of BMP mitigation on streamflow disturbance, channel erosion, and stream sedimentation due to impervious surfaces, subsurface storm sewers, and altered landform due to urbanization.

Our primary research activities are to map the development and changes in surface topography associated with urbanization as it occurs and monitor the physical, chemical, and biological aspects of the associated water resources. Changes in streamflow and biological and chemical parameters of the CSPA water resources (or the lack thereof) will be correlated with development patterns, anthropogenic alterations of the environment, and the BMPs designed to mitigate the impacts of development. The U.S. Environmental Protection Agency (U.S. EPA) has funded the placement of five research-grade streamflow gauges and obtained two LIght Detection And Ranging (LIDAR) overflights of the study area (2002 and 2004) that greatly

increases the spatial resolution of the topographical analyses possible in the CSPA. These and future LIDAR collections will be used to determine whether this technology can be used to map changes in stream morphology associated with development as well as assist in the hydrological modeling and surface mapping of that development.

Although this work was reviewed by the U.S. EPA and approved for publication, it may not necessarily reflect official Agency policy.